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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/560,815 | 12/15/2005 | Seiichi Saito | 8007-1101 | 9007 |
| <small>465</small> YOUNG & THOMPSON 209 Madison Street Suite 500 ALEXANDRIA, VA 22314 | | | <small>7590</small> EXAMINER USELDING, JOHN E | |
| | | | ART UNIT 4171 | PAPER NUMBER |
| | | | MAIL DATE 08/06/2008 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/560,815

Applicant(s)

SAITO, SEIICHI

Examiner

John Uselding

Art Unit

4171

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-15 and 20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-15 and 20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date ____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Claim Objections

1. Claims 2, 10, 11, 13, and 20 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 2 has a broader limitation with respect to the flame retardant than claim 1.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

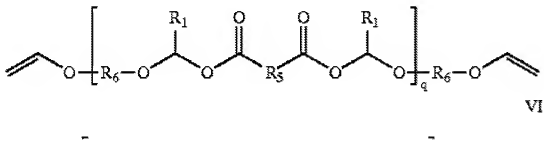
3. Claims 1-5, 7-8, 10-15, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crane et al. (6,667,194) in view of Seiichi et al. (JP 2001-354836), further in view of Suzuki et al. (2003/0059978).

4. Applicant claims a composition comprising a polyfunctional vinyl ether compound, a polyhydric phenol compound, and a flame retardant, wherein the composition contains 10-30 parts by weight of a phosphorus-based flame retardant per 100 parts of the total of the polyfunctional vinyl ether compound and the polyhydric phenol compound (claim 1). Applicant claims 100 parts polyfunctional vinyl ether, 30-

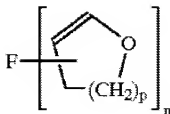
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200 parts polyhydric phenol, 10-3000 parts filler, and 10-200 parts flame retardant (claim 2). Applicant claims that the polyfunctional vinyl ether is a tetra- or higher functional compound (claims 3, 10). Applicant claims a particular polyhydric phenol resin (claims 4, 11, 12). Applicant claims 10-1000 parts silica filler (claims 5, 13-15). Applicant claims a particular phosphorus-based flame retardant (claims 7, 20). The composition further comprises a polyepoxy compound (claim 8).

5. Crane et al. teach a sealing composition for a semiconductor (column 1, lines 15-26). The composition comprises an epoxy resin (column 12, lines 61-64), polyfunctional phenol curing agent (column 13, lines 38-50), and a polyfunctional vinyl ether. The polyfunctional vinyl ether can be formula IV:

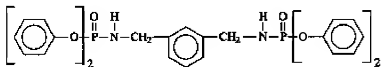


The R^5 and R^6 substituents can be alkenylene (column 8, line 41), which would make it have a functionality of 4 or greater. The R^1 substituent can also be reactive functional groups (column 9, lines 30-33), which would make it have a functionality of 4 or greater. The vinyl ethers can also be formula IV:



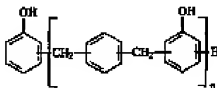
with n being an integer from 2-30 (column 4, line 21). It would be obvious to select an integer from 4-30 within that range. There is substantial overlap. The vinyl ether prevents the corrosion during heating (column 3, lines 7-15). The vinyl ether is used from 1-80 wt% (column 17, lines 26-35). They also teach using 0.1-70% by weight silica as inorganic filler (column 18, lines 1-8).

6. What Noro et al. fails to teach is the phosphorus flame retardant, the particular polyhydric phenol in claims 4, 11, and 12, and the mixing ratios of the components that are claimed.
7. Suzuki et al. teach using phosphorus based flame retardants in epoxy resin sealant compositions for semiconductor devices (0025).
8. Suzuki et al. fail to teach the particular phosphorus flame retardant claimed in claims 7 and 20.
9. Seiichi et al. teach Seiichi et al. teach a fire retardant epoxy composition containing a fire retardant of the structure (formula 23):



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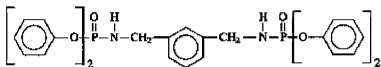
and an epoxy curing agent that is a polyfunctional phenol (0067) of the structure (Table 1):



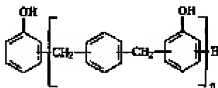
Seiichi et al. teach that their composition especially suited for electrical devices (0071, 0092).

10. Since Seiichi et al. teach a composition for electrical devices and Suzuki et al. teach using phosphorus flame retardants in sealant compositions for semiconductor devices it would have been obvious to one of ordinary skill in the art to included the phosphorus based flame retardant of Seiichi et al. into the sealant composition of Crane et al. to make a flame retardant sealant composition. It also would have been obvious to have used the polyfunctional phenol curing agent of Seiichi et al. for the polyfunctional phenol curing agent of Crane et al. It is obvious to optimize result effective variables. It would have been obvious to have optimized the amount of phosphorus flame retardant depending on the desired flame retardancy. It would have been obvious to optimize the polyhydric phenol curing agent depending on the hardness of the epoxy resin that was desired. It would have been obvious to have optimized the amount of the silica filler depending on the additional fire retardant, heat resistance, and moisture resistance desired for the epoxy resin. It would have been obvious to have optimized the amount of polyfunctional vinyl ether depending on the desired corrosion prevention during heating.

11. Claims 1-2, 4, 5, 7-8, 11-13, 15, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noro et al. (2002/0151106) in view of Seiichi et al. (JP 2001-354836), further in view of Suzuki et al. (2003/0059978).
12. Applicant claims what is listed above.
13. Noro et al. teach a sealing composition for a semiconductor (0002). The composition comprises an epoxy resin (0015), phenolic-based curing agent (0016), and a polyfunctional vinyl ether (0019). The vinyl ether prevents the progress of oxidation during heating (0060). The phenol curing agent is phenol novolak resin, which is a polyhydric phenol resin (0096). The phenol curing agent is used from 0.6 to 1.4 equivalence (0097). They also teach using up to 85% by weight silica as inorganic filler (0099).
14. What Noro et al. fails to teach is the phosphorus flame retardant, the particular polyhydric phenol in claims 4, 11, and 12, and the mixing ratios of the components that are claimed.
15. Suzuki et al. teach using phosphorus based flame retardants in epoxy resin sealant compositions for semiconductor devices (0025).
16. Suzuki et al. fail to teach the particular phosphorus flame retardant claimed in claims 7 and 20.
17. Seiichi et al. teach Seiichi et al. teach a fire retardant epoxy composition containing a fire retardant of the structure (formula 23):



and an epoxy curing agent that is a polyhydric phenol (0067) of the structure (Table 1):



Seiichi et al. teach that their composition especially suited for electrical devices (0071, 0092).

18. Since Seiichi et al. teach a composition for electrical devices and Suzuki et al. teach using phosphorus flame retardants in sealant compositions for semiconductor devices it would have been obvious to one of ordinary skill in the art to included the phosphorus based flame retardant of Seiichi et al. into the sealant composition of Noro et al. to make a flame retardant sealant composition. It also would have been obvious to substitute the polyhydric phenol curing agent of Seiichi et al. for the polyhydric phenol curing agent of Noro et al. since they are functional equivalents. It is obvious to optimize result effective variables. It would have been obvious to have optimized the amount of phosphorus flame retardant depending on the desired flame retardancy. It would have been obvious to optimize the polyhydric phenol curing agent depending on the hardness of the epoxy resin that was desired. It would have been obvious to have optimized the amount of the silica filler depending on the additional fire retardant, heat resistance, and moisture resistance desired for the epoxy resin. It would have been

obvious to have optimized the amount of polyfunctional vinyl ether depending on the desired oxidation prevention during heating.

19. Claims 1, 2, 5, 8, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. (20010053820)
20. Applicant claims what is listed above and a prepreg formed using the composition (claim 9).
21. Yeager et al. teach a composition comprising polyhydric phenol (0011), hydroxyethyl vinyl ether (0043), which is a di-functional vinyl ether, epoxy polymers (0028), silica fillers (0064) and phosphorus based flame retardants (0061). They teach that this composition can be used to make a prepreg (claim 42). The polyhydric phenol is present at least 50% of the composition (0008). It is obvious to select the overlapping portions of the polyhydric phenol range of Yeager et al. and the parts by weight as claimed by the applicant. The hydroxyethyl vinyl ether is at least 30 parts by weight (0036). It is obvious to select the overlapping portions of the polyhydric phenol range of Yeager et al. and the parts by weight as claimed by the applicant.
22. Yeager et al. fail to teach the ratio of the components as claimed.
23. It is obvious to optimize result effective variables. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the amount of phosphorus flame retardant depending on the desired flame retardancy. It would have been obvious to optimize the polyhydric phenol depending on the amount of

additives that are desired. It would have been obvious to have optimized the amount of the silica filler depending on the additional fire retardant, heat resistance, and moisture resistance desired for the composition. It would have been obvious to have optimized the entire composition for the above reasons to meet the ratios given in the claim limitations.

Response to Arguments

24. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. The new grounds of rejection have been added as necessitated by the amendment to claim 1.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Uselding whose telephone number is (571)270-5463. The examiner can normally be reached on Monday-Thursday 6:00a.m. to 4:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/
Primary Examiner, Art Unit 1796

John Uselding
Examiner
Art Unit 4171

/JEU/

